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The diagnosis of depression and use of antidepressants in nursing home residents with and without dementia

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Objective: To compare the prevalence of diagnosed depressive disorders, depressive symptoms and use of antidepressant medication between nursing home residents with and without dementia.

Methods: This cross-sectional study used Minimal Data Set of the Resident Assessment Instrument 2.1 data collected in seven nursing homes located in an urbanized region in the Netherlands. Trained nurse assistants recorded all medical diagnoses made by a medical specialist, including dementia and depressive disorder, and medication use. Depressive symptoms were measured with the Depression Rating Scale. Multivariate logistic regression analysis was used to compare data between residents with and without dementia.

Results: Included in the study were 1885 nursing home residents (aged 65 years or older), of which 837 had dementia. There was no significant difference in the prevalence of diagnosed depressive disorder between residents with (9.6%) and without dementia (9.8%). Residents with dementia (46.4%) had more depressive symptoms than residents without dementia (22.6%). Among those with depressive symptoms, residents with dementia had the same likelihood of being diagnosed with a depressive disorder as residents without dementia. Among residents with a diagnosed depressive disorder, antidepressant use did not differ significantly between residents with dementia (58.8%) and without dementia (57.3%). The same holds true for residents with depressive symptoms, where antidepressant use was 25.3% in residents with dementia and 24.6% in residents without dementia.

Conclusions: Regarding the prevalence rates of diagnosed depressive disorder and antidepressant use found in this study, our findings demonstrate that there is room for improvement not only for the detection of depression but also with regard to its treatment.

Key words: aged; nursing homes; depressive disorder; dementia; depressive symptoms; antidepressant use
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Introduction

Depression is common among nursing home residents worldwide. A recent review showed the median prevalence of major depressive disorder and depressive symptoms to be 10% and 29%, respectively, among nursing home residents (Seitz *et al.*, 2010). Both depression and depressive symptoms in nursing home residents are associated with various negative outcomes, such as reduced quality of life, increased use of health care services and a greater burden on nursing home staff (Achterberg *et al.*, 2003; Smalbrugge *et al.*, 2006; Verkaik *et al.*, 2009).

In general, two main types of nursing home residents can be distinguished: residents with and without dementia. In the Netherlands, nursing homes have "somatic wards" where residents with mainly physical handicaps stay. Residents who mainly have dementia

stay at "psychogeriatric wards." Dementia is also common among nursing homes residents worldwide, with a median prevalence of 58% (Seitz *et al*., 2010).

In Dutch studies, high prevalence rates for depressive disorders or depressive symptoms have been found among nursing home residents with and without dementia (Jongenelis *et al*., 2004; Zuidema *et al*., 2007; Verkaik *et al*., 2009). Given the high prevalence rates and adverse effects of depression, it is important that depression in nursing home residents with and without dementia is adequately diagnosed and treated. Therefore, knowledge on diagnosis and treatment in daily nursing home practice is important, focused on both types of residents. Only a few studies have been carried out focusing simultaneously on both groups in nursing homes or homes for the aged (Janzing *et al*., 2002; Davison *et al*., 2007; Baller *et al*., 2010). A recent Dutch study in homes for the aged suggests that residents with dementia are more at risk of being under-diagnosed for depression than residents without dementia (Baller *et al*., 2010). However, it is not yet known whether the same holds true for nursing home residents with dementia, often at a more advanced stage.

To our knowledge, no study has directly compared the use of antidepressants by nursing home residents with and without dementia. Studies focusing on one of the two subgroups of nursing home residents have found the rate of antidepressant use to be 27% among residents with dementia (Nijk *et al*., 2009) and 26% among residents without dementia (Smalbrugge *et al*., 2006). Considering that the prescription of antidepressants is not always the first option among nursing home residents, these numbers are high. For example, for depression and a chronic health problem, national and international guidelines specify that psychological interventions and pharmacotherapy are equally recommended (CBO, 2005; NICE clinical guidelines Dementia, 2006; NICE clinical guidelines Depression with a chronic physical health problem, 2009).

The present study aims to gain more insight into the diagnosis and treatment of depression in daily nursing home care for residents with and without dementia by investigating the following research questions:

(1) Is the prevalence of depressive disorders different for residents with depressive symptoms and dementia as compared with residents with depressive symptoms but without dementia?
(2) Is the prevalence of antidepressant use different for residents with depressive symptoms or a depressive disorder in combination with dementia as compared with residents with depressive symptoms or a depressive disorder but without dementia?

Methods

Subjects and design

The data of this study were collected in seven nursing homes located in an urbanized region in the Netherlands. A cross-sectional analysis was performed on 1885 residents aged 65 years and older.

Measurements

Data from the Dutch version of the Minimal Data Set of the Resident Assessment Instrument 2.1 (MDS-RAI) for Nursing Home Care were used (InterRAI 2002). This web-based instrument contains 120 questions and provides an overview of the medical, physical, psychological, behavioral, and social status of long-term care residents. Since 2000, several Dutch nursing homes have started using this instrument. According to national registration systems (Prismant & Arcares, 2002), the residents of the participating nursing homes constituted a representative sample of the nursing homes in the Netherlands in 2002.

The seven participating nursing homes were selected because they have been using the MDS-RAI for a longer period—at least since 2005—which is important for the quality of the data. Data were extracted from the database on 31 December 2008. Thus, all variables described below were measured with the MDS-RAI.

The assessments with MDS-RAI were performed for every resident at admission, quarterly, and at discharge. Nursing assistants who were involved in the daily care of the residents were trained to complete the forms. The training consisted of a two-day course, during which the nursing assistants learned to work with the MDS-RAI and studied the manual (Frijters, 2001). An expert-supervisor was available to answer questions on the MDS-RAI from nursing assistants using the instrument as part of their daily work activities. In addition, an Elderly Care Physician, that is, a medical specialist in the field of nursing home medicine with 3 years of post-academic training, performed a geriatric assessment, and provided the information for the medical items on the MDS-RAI (Koopmans *et al*., 2010). Because the data collected were anonymous routine care data and the residents were not subjected to interventions nor did they have to obey behavioral rules, no approval of the ethical committee was needed to perform this study.

Independent variable

Dementia. Dementia was recorded as a medical diagnosis in the MDS-RAI. In accordance with established psychiatric diagnostic criteria for dementia, the diagnosis is usually made by a geriatrician or at a memory clinic (Baller *et al.*, 2010).

Outcome variables

Depressive disorder. Depressive disorder is one of the medical diagnoses recorded in the MDS-RAI. When the medical specialist (see above) determines that the resident has recovered with no need for further treatment, the diagnosis is removed from the new MDS-RAI assessment.

Depressive symptoms. The presence of depressive symptoms was measured by the Depression Rating Scale (DRS) (Burrows *et al.*, 2000). The DRS consists of seven items on mood, which are scored for every resident by care staff observations. The scores per item vary between 0 (not present), 1 (1 to 5 times a week for the last 30 days) and 2 (at least 6 to 7 times a week for the last 30 days). A score of 3 points or higher indicates clinically relevant depressive symptoms. Although the internal consistency of the DRS is low with a Cronbach's alpha of 0.67, it was much higher in a previous Dutch study (0.87) (Achterberg *et al.*, 2006). The DRS has been shown to have high sensitivity and acceptable specificity rates (Burrows *et al.*, 2000).

Antidepressants. The use of medication, including antidepressants, is also recorded in the MDS-RAI. For the purposes of this study, when residents used an antidepressant at least once in the last 7 days, we considered them to be using antidepressants.

Confounders. We included gender, age, number of physical disease diagnoses, and activities of daily living (ADL) dependency as confounders. The number of physical disease diagnoses was divided into four categories: 0, 1, 2 and 3, or more physical disease diagnoses. A physical disease diagnosis means being diagnosed with a physical disease as registered in the MDS-RAI, except Alzheimer's disease, dementia other than Alzheimer's disease, and the diseases registered in the category of psychiatric/mood disorders. Examples include musculoskeletal or pulmonary diseases.

Activities of daily living dependency was measured using a hierarchic ADL rating scale based on items in the MDS-RAI. The scores on this scale range from 0 (independent) to 6 (total dependence). Residents with an ADL score of 0 to 2 can be considered "relatively independent" and residents with an ADL score of 3 to 6 "dependent" (Mor *et al.*, 1995; Achterberg *et al.*, 2003). We divided the residents into these two categories.

Data analyses

Statistical analyses were conducted with SPSS 15.0 (SPSS Inc., Armonk, New York, USA). The Fisher's exact test was used to determine whether residents with and without dementia differed significantly in terms of gender, number of physical disease diagnoses, and ADL. To determine whether age differed significantly between these groups, we used the Independent-Samples *T*-test.

We used logistic regression analysis to calculate the odds ratio and 95% confidence interval for associations with dementia as the independent variable and diagnosed depressive disorder, depressive symptoms, and use of antidepressants as the respective dependent variables. In model 1, the potential influence of using data from different nursing homes was taken into account by including dummy variables representing the seven nursing homes. In model 2, there was also adjusted for the following potential confounders: age, gender, number of physical disease diagnoses, and ADL. The level of significance was established at $p < 0.05$.

Results

Sample

The sample for this study consisted of 1885 nursing home residents, of which 837 (44%) had been diagnosed with dementia. Characteristics of the residents with and without dementia are presented in Table 1. Residents with dementia were on average older and had less physical disease diagnoses in comparison with residents without dementia. Furthermore, more residents with dementia were ADL dependent.

Prevalence of depressive symptoms and diagnosed depressive disorders

Prevalence of depressive symptoms. According to the MDS Depression Rating Scale (MDS-DRS) (≥3), almost half of the residents with dementia (46.4%) and nearly a quarter (22.6%) of the residents without dementia had depressive symptoms (Table 2). This

Table 1 Characteristics of the sample ($N = 1885$)

	Residents with dementia	Residents without dementia	*p*-value
Number of residents	837	1048	
Gender			
Male (%)	27.7	28.8	
Female (%)	72.3	71.2	0.61
Age (mean, SD)	84 (6.9)	81.9 (7.8)	<0.001
Number of disease diagnoses			
0–1 (%)	39.2	30.3	
≥2 (%)	60.8	69.7	<0.001
ADL dependency			
Relatively independent (%)	19.2	52.2	
Dependent (%)	80.8	47.8	<0.001

SD, standard deviation; ADL, activities of daily living.

difference is statistically significant when only adjusting for the potential utility of analyzing data from different nursing homes (model 1: $p < 0.001$). When age, gender, number of physical disease diagnoses, and ADL were added as confounders, the difference remained significant (model 2: $p < 0.001$).

Prevalence of diagnosed depressive disorders. Table 2 shows that 9.6% of the residents with dementia and 9.8% of the residents without dementia had been diagnosed with a depressive disorder. No significant difference was found between the two groups either in model 1 ($p = 0.95$) or model 2, even when adjusted for age, gender, number of physical disease diagnoses, and ADL ($p = 0.47$).

Relation between depressive symptoms and diagnosed depressive disorder. Among the residents with depressive symptoms, 13.4% of the residents with dementia had been diagnosed with a depressive disorder, as compared with 22% of the residents without dementia (Table 3). In model 1, this difference was significant ($p = 0.03$). In other words, among those with depressive symptoms, residents with dementia had a lower likelihood of being diagnosed with a depressive disorder than residents without dementia.

However, when age, gender, number of physical disease diagnoses, and ADL are added as confounders, this difference was not found to be significant ($p = 0.19$).

Antidepressant treatment

Prevalence of antidepressant use among residents with depressive symptoms. Among the residents with depressive symptoms, the rate of antidepressant use did not differ significantly between residents with dementia (25.3%) and without (24.6%), either in model 1 ($p = 0.59$) or model 2 ($p = 0.17$) analysis (Table 4). In other words, among those with depressive symptoms, residents with dementia had a similar likelihood of using antidepressants as residents without dementia.

Prevalence of antidepressant use in residents with a diagnosed depression. Nearly 60% of the residents with a diagnosed depressive disorder were using antidepressants. There was no significant difference between residents with (57.3%) and without (58.8%) dementia regarding rate of antidepressant use, either in model 1 ($p = 0.79$) or model 2 ($p = 0.52$) (Table 5).

In other words, among those with a diagnosed depressive disorder, residents with dementia had similar odds of using antidepressants as residents without dementia.

Discussion

This study found that the prevalence of diagnosed depressive disorders is nearly 10% for residents both with and without dementia. This figure is substantially lower than the prevalence rates found in earlier Dutch epidemiological studies: 19% for residents with

Table 2 Prevalence of depressive symptoms and diagnosed depressive disorders, comparison of residents with and without dementia (%)

	Residents with dementia	Residents without dementia	Model	OR (95% CI)	*p*-value
Depressive symptoms (%)	46.4	22.6	1	2.90 (2.36–3.59)	<0.001
			2[a]	2.40(1.91–3.00)	<0.001
Diagnosed depressive disorder (%)	9.6	9.8	1	0.99 (0.72–1.37)	0.95
			2[b]	1.14 (0.80–1.61)	0.47

OR, odds ratio; CI, confidence interval; ADL, activities of daily living.
[a]Higher ADL disability was significantly associated with having depressive symptoms ($p < 0.001$).
[b]Being female ($p = 0.05$) and having three or more disease diagnoses were significantly associated with being diagnosed with depression ($p < 0.001$).

Table 3 Prevalence of diagnosed depressive disorder within the group of residents with depressive symptoms, comparison of residents with and without dementia (%)

	Residents with depressive symptoms ($N = 623$)				
	With dementia ($N = 387$)	Without dementia ($N = 236$)	Model	OR (95%CI)	p-value
Diagnosed depressive disorder (%)	13.4	22	1 2	0.60 (0.38–0.94) 0.72 (0.45–1.18)	0.03 0.19

OR, odds ratio; CI, confidence interval.

Table 4 Prevalence of antidepressant use compared within the group of residents with depressive symptoms, comparison of residents with and without dementia (%)

	Residents with depressive symptoms ($N = 623$)				
	With dementia ($N = 387$)	Without dementia ($N = 236$)	Model	OR (95%CI)	p-value
Antidepressant use (%)	25.3	24.6	1 2[a]	1.12 (0.75–1.67) 1.36 (0.88–2.10)	0.59 0.17

OR, odds ratio; CI, confidence interval.
[a]Age ($p < 0.001$) and having three or more disease diagnoses ($p = 0.005$) is significantly associated with prevalence of use of antidepressants.

Table 5 Prevalence of antidepressant use compared within the group of residents with a diagnosed depressive disorder, comparison of residents with and without dementia (%)

	Residents with a diagnosed depressive disorder ($N = 183$)				
	With dementia ($N = 80$)	Without dementia ($N = 103$)	Model	OR (95%CI)	p-value
Antidepressant use (%)	58.8	57.3	1 2	1.11 (0.58–2.10) 1.26 (0.62–2.58)	0.79 0.52

OR, odds ratio; CI, confidence interval.

dementia and 22% for residents without dementia (Jongenelis *et al.*, 2004; Verkaik *et al.*, 2009). The residents who took part in those studies were diagnosed by researchers using diagnostic interviews. The prevalence rates in the present study were gathered through observations by Elderly Care Physicians in day-to-day practice. Therefore, the lower prevalence rates of depressive disorder found in this study are probably due to under-diagnosis by Elderly Care Physicians. The period between this and earlier studies is 2 to 7 years. It does not seem likely that prevalence rates were halved because of improvements in the treatment of depression in nursing homes in the last few years. It is also unlikely that the selected nursing homes included in this study are doing a much better job on the treatment of depression than those in the previous studies.

In this study, the prevalence of depressive symptoms differed significantly between nursing home residents with (46.4%) and without (22.6%) dementia. The prevalence of depressive symptoms in residents with dementia is substantially higher than observed in earlier Dutch research showing a prevalence rate of 20% (Zuidema *et al.*, 2007). In contrast, the prevalence of depressive symptoms in residents without dementia does not differ much from earlier findings in Dutch studies, namely 24% (Jongenelis *et al.*, 2004) and 27% (Achterberg *et al.*, 2006). However, it is difficult to interpret comparisons between the present study and earlier studies regarding the prevalence of depressive symptoms, because different instruments were used to measure depressive symptoms. The MDS-DRS was used in some studies (Achterberg *et al.*, 2006). This scale has been found to be highly sensitive but lacks specificity (Burrows *et al.*, 2000), which might explain the high prevalence rates found. Furthermore, the MDS-DRS is an observer-rated scale, and these items might identify different elements of depression than self-report instruments such as the Geriatric Depression Scale used in certain studies (Jongenelis *et al.*, 2004; Zuidema *et al.*, 2007). Regarding

depressive symptoms, it is therefore difficult to compare the rates found in more recent studies and earlier studies in which self-report instruments were used.

Within the group of residents with depressive symptoms, residents with and without dementia did not differ significantly with regard to the prevalence rates of depressive disorders. Baller *et al.* (2010) found that among residents in homes for the aged with depressive symptoms according to the MDS-DRS, those with dementia were significantly less likely to be diagnosed with a depressive disorder than residents without dementia. They concluded that residents with dementia in homes for the aged were at an increased risk for under-diagnosis of depression as compared with those without dementia. The findings of the present study suggest that this trend seems to be absent in nursing home residents, although the prevalence rate of diagnosed depressive disorders is lower in residents with dementia with depressive symptoms.

Antidepressant use was at almost 60% among residents with a diagnosed depressive disorder and around 25% among residents with depressive symptoms. No significant differences were found between residents with and without dementia regarding antidepressant use in either of the subgroups. In general, these levels of antidepressant use are difficult to evaluate, because phenotypes of depression among nursing home residents are unclear, and the heterogeneity related to medical and cerebrovascular changes is high (Lenze *et al*., 2011). Furthermore, the reason for which antidepressants are prescribed (selective serotonin reuptake inhibitors might also be prescribed for agitation, aggression, and anxiety disorders, and tricyclic antidepressants might be prescribed for neuropathic pain), the dose, and beneficial effects and side effects are all unknown.

The rate of 60% of antidepressant use could point to either underuse or overuse among nursing home residents with dementia. A recent study showed that antidepressant use among depressed nursing home residents (with and without dementia) is 75% (Hanlon *et al*., 2011). Because several guidelines advise treatment with an antidepressant, this study suggests that this percentage might indicate under-treatment.

On the other hand, other studies have found that the efficacy of antidepressants among people with dementia, especially Alzheimer's disease, is small (Banerjee *et al*., 2011), and the use of such medication also carries potentially serious long-term risks, such as falls, bone loss, and fractures (Richards *et al*., 2007; Nelson and Devanand 2011; Sterke *et al*., 2012). Several national and international guidelines indicate people with dementia and major depression should be offered antidepressants. However, these guidelines also indicate that cognitive behavioral therapy or psychosocial treatment may be considered as part of the treatment. For people with chronic physical health problems, psychosocial interventions and pharmacotherapy are both equally recommended. (CBO, 2005; NICE clinical guidelines Dementia, 2006; NICE clinical guidelines Depression with a chronic physical health problem, 2009). This study did not investigate the rate of psychosocial interventions and the distinction between major and minor depression cannot be made. This adds to the difficulties in evaluating the levels of antidepressant use found in this study.

Apart from the lack of knowledge of the reasons for prescribing antidepressants, our study has other limitations. In this observational study in daily practice, the way in which diagnoses were made remains unclear. Most likely, they were made by an Elderly Care Physician on the basis of the DSM-IV criteria. In the Netherlands, these physicians have received specialized vocational training on the diagnosis and treatment of mood disorders. Psychologists, who are affiliated to most nursing homes, might also have played a role. Furthermore, the depressive symptoms as scored by the health care staff might lack accuracy. Although they were trained, it is well known that their workload is high and that their training is not always sufficient. Moreover, although the residents of the seven nursing homes in this study constituted a representative sample in 2002 (Prismant & Arcares, 2002), it is uncertain whether this is still the case and whether we still can generalize the results to the general nursing home population.

Finally, we controlled for several potentially important variables: gender, age, the number of physical disease diagnoses, and ADL. However, there might have been other unmeasured variables that could have influenced the results.

In conclusion, this study shows that there is room for improvement not only in the diagnosis of depression but also with regard to its treatment. The use of psychosocial interventions, such as recreational activities, physical exercise, changes to the living environment, or music therapy, must be taken more seriously in nursing homes. This might entail a reconsideration of the professional disciplines needed in the assessment and treatment of nursing home residents, and there may be a need to improve the team in charge (Pot *et al*., 2007). Further research on the use of antidepressants in nursing homes is required and should take into account the severity of the depression, the reason for prescription, as well as the beneficial and detrimental side effects.

Key points

- Diagnosed depressive disorders and antidepressant use are not more prevalent in nursing home residents with dementia than in residents without dementia, although residents with dementia have more symptoms of depression.
- Depressive disorders among nursing home residents are probably under-diagnosed.
- Antidepressant use among nursing home residents is associated with depressive symptoms and is for this and other reasons too high in residents with dementia.
- Regarding treatment of depression in nursing homes, the use of psychosocial interventions must be taken more seriously.

Conflicts of interest

The authors declare that they have no competing interests.

Author contributions

I. A. drafted the manuscript and helped in designing the study. J. N. supervised the study as well as the drafting of this manuscript. M. V., D. F., W. A., and A. M. P. designed and supervised the study as well as the present manuscript.

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